



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/810,693	03/29/2004	Minoru Kadoya	P-6637-US	1219
49443	7590	09/26/2006	EXAMINER	
PEARL COHEN ZEDEK, LLP 1500 BROADWAY 12TH FLOOR NEW YORK, NY 10036			ROGERS, KELLY A	
			ART UNIT	PAPER NUMBER
			2828	

DATE MAILED: 09/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/810,693	KADOYA, MINORU	
	<b>Examiner</b>	<b>Art Unit</b>	
	Kelly A. Rogers	2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_\_.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-4 and 6-9 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_ is/are allowed.  
 6) Claim(s) 1-4 and 6-9 is/are rejected.  
 7) Claim(s) \_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 29 March 2004 is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____.<br>   | 6) <input type="checkbox"/> Other: _____                          |

***Response to Amendment***

The drawing objections are withdrawn based on applicant's amendment filed on June 07, 2006.

The abstract objection of misspelled words is withdrawn based on applicant's amendment filed on June 07, 2006.

The specification objections of page 5, line 32 and page 7, line 14 and page 8, line 24 and line 33 are withdrawn based on applicant's amendment filed on June 07, 2006.

Claims 1-4 and 6-9 are pending.

The claim rejection for claim 5 is withdrawn because applicant canceled claim 5.

The 112-second paragraph claim rejection of claim 1 is withdrawn based on applicant's amendment filed on June 07, 2006.

***Response to Arguments***

Applicant's arguments filed June 07, 2006 pertaining to claims 1-4, 6, 7, and new claims 8 and 9 have been fully considered, but they are not persuasive. Applicant asserts that claims depending on claim 1, claims 2-4 and 6-9, are allowable in accordance with amended claim 1 being allowable. Applicant has amended claim 1 to establish a common heat sink for all the laser crystals, positioned adjacent to them and parallel to the optical axis. The teachings of Ludewigt et al. (6,873,633) in combination with Phua et al. (6,807,200) fully anticipates the limitations of claim 1.

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim 1, 2, 8, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ludewigt et al. (6,873,633), and further in view of Phua et al. (6,807,200).

As to claims 1, 8, and 9 Ludewigt et al. teaches a solid state laser comprising a laser resonator including an output mirror, a laser crystal containing rare earth ions, and at least one reflecting mirror; said output mirror, laser crystal, and reflecting mirror being arranged along an optical axis [see figure 3]. Ludewigt further clarifies that these components are arranged along the same optical axis [column 6, lines 14-16]. Ludewigt teaches a laser diode for emitting pumping light [column 2, lines 60-64] and a pumping optical system for focusing pumping light emitted from said laser diode onto said laser resonator coaxially with said optical axis is inherent due to the need to focus the pumping light upon the resonator [column 2, lines 36-39]. Ludewigt describes that the said laser crystal comprises a plurality of individual laser crystals arranged along said optical axis, said individual laser crystals being each made of a material having a composition expressed by a same chemical formula and having progressive higher concentrations of said rare earth ions toward said output mirror [figures 3 and 4a; column 2, lines 47-53; column 3, lines 64-67; and column 7, lines 54-57].

Ludewigt et al. fails to disclose said individual laser crystals are provided with a common heat sink for removal of heat; and wherein said heat sink is positioned adjacent to the surfaces of said laser crystals that are parallel to said optical axis.

Ludewigt et al. also fails to disclose heat generated by said individual laser crystals is removed through said heat sink in a direction substantially perpendicular to said optical axis or that said individual laser crystals are held by said heat sink.

Phua et al. teaches said individual laser crystals are provided with a common heat sink for removal of heat; and wherein said heat sink is positioned adjacent to the surfaces of said laser crystals that are parallel to said optical axis, that heat generated by said individual laser crystals is removed through said heat sink in a direction substantially perpendicular to said optical axis, and that said individual laser crystals are held by said heat sink [column 4, line 67].

It would have been obvious to one of ordinary skill in the art to modify the apparatus disclosed by Ludewigt et al. by incorporating the features disclosed by Phua et al.

One would have been motivated to make this modification in order to avoid thermal birefringence and ensure elements remain aligned as implied by Phua et al. [column 1, lines 18-35].

As to claim 2, Ludewigt et al. teaches said individual laser crystals are disposed of in close mutual contact [figure 3; column 3, lines 34-37].

Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ludewigt et al. in combination with Phua et al. as applied to claim 1 above, and further in view of Hargis et al. (5,751,751).

Ludewigt et al. in combination with Phua et al. disclose all the characteristic features of claim 1 of the present invention as recited above.

Ludewigt et al. in combination with Phua et al. fails to disclose the individual laser crystals being integrally bonded to each other. Ludewigt et al. in combination with Phua et al. also fails to disclose the individual laser crystals being spaced from each other by a gap substantially smaller than a length of a shortest one of said individual laser crystals.

Hargis et al. discloses the obvious alternative embodiments of the individual laser crystals being integrally bonded to each other [figure 7; column 7, lines 11-13] and the individual crystals being spaced from each other by a gap substantially smaller than a length of a shortest one of said individual laser crystals [Figure 8; column 7, lines 17-20].

It would have been inherently obvious to one of ordinary skill in the art at the time of invention by applicant to modify the apparatus disclosed by Ludewigt et al. in combination with Phua et al. to include the features disclosed by Hargis et al. because these features describe common means for connecting a plurality of laser crystals in a solid state laser apparatus.

One would have been motivated to make these modifications to the apparatus described by Ludewigt et al. in order to establish a polarized composite cavity in which frequency doubling to the blue of its fundamental frequency occurs as implied by Hargis et al. [column 3, lines 1-5].

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ludewigt et al. in combination with Phua et al. as applied to claim 1 above, and further in view of Dell'Acqua et al. (2005/0152426).

Ludewigt et al. in combination with Phua et al. discloses all the characteristic features of claim 1 of the present invention as recited above.

Ludewigt et al. in combination with Phua et al. fails to disclose the individual laser crystals being made from a material selected from a group consisting of  $\text{YVO}_4$ ,  $\text{Y}_3\text{Al}_5\text{O}_{12}$  (YAG),  $\text{LiYF}_4$  (YLF), and  $\text{GdVO}_4$ .

Ludewigt et al. in combination with Phua et al. also fails to disclose the rare earth ions consisting of neodymium ions.

Dell'Acqua et al. discloses both the rare earth ions as neodymium ions and the individual laser crystals being made from a material selected from a group consisting of  $\text{YVO}_4$ ,  $\text{Y}_3\text{Al}_5\text{O}_{12}$  (YAG),  $\text{LiYF}_4$  (YLF), and  $\text{GdVO}_4$  [paragraph 14].

It would have been inherently obvious to one of ordinary skill in the art at the time of invention by applicant to modify the apparatus disclosed by Ludewigt et al. in combination with Phua et al. to include the features disclosed by Dell'Acqua et al. because these features describe common optical gain media means for solid state laser apparatuses.

One would have been motivated to make these modifications to the apparatus described by Ludewigt et al. in combination with Phua et al. in order to obtain laser sources with high brightness and other specific requirements for different applications as implied by Dell'Acqua et al. [paragraph 13].

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kelly A. Rogers whose telephone number is 571-272-8047. The examiner can normally be reached on Monday through Friday 9am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2828

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KAR

Kelly.Rogers@uspto.gov

20060906

MINSUN OH HARVEY  
PRIMARY EXAMINER